

## 2.1 Standards of Measurement

### I. Units and Standards

1. Standard - an exact quantity that people agree to use for a comparison

a. allows measurements to be compared

example: mile  $\Rightarrow$  standard

Highwood is 44 miles away

Fort Benton is 27 miles away

Stanford is 35 miles away

Sep 20-10:33 AM

## II Measurement Systems

### A. International System of Units (SI units)

1. SI units - the standard system of measurement used worldwide

a. each measurement has a base unit

b. SI system uses powers of ten

example: long distances are measured as <sup>1,000 meters</sup> kilometers (km)

C. Look at Table 2-1

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### B. Measuring to the Moon?

→ how do we measure extreme distances?

1. Even with SI units, measuring extreme distances can be difficult

a. AUs - astronomical units

(151,000,000,000m)

2. Mirrors on the Moon

a. Mirrors put on the Moon 1970s

→ used light reflection with lasers on Earth to mirrors on moon to measure the distance using the speed of light

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## 2.2. Using SI Units

### I. SI Units and Symbols

A. Every quantity measured has a base unit and a symbol for that unit

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Table 2-2

SI BASE Units		
Quantity	Unit	Symbol
Length	Meter	m
Mass	Kilogram	kg
Time	Seconds	s
Electric current	Ampere	A
Temp	Kelvin	K
Amount of substance	Mole →	mol
(Luminosity) Light Intensity	Candela	cd

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Objects

	Rock	Stick	'	''
String length	2SLs			
Standard				

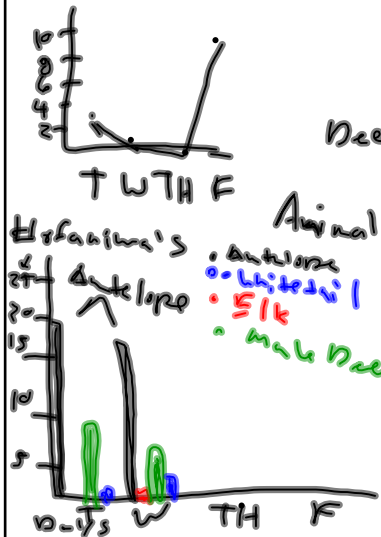
Compare how well your  
System of measurement  
compared to the standard

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## 2.3 Graphing

### I. Using Graphs

A. It is helpful to illustrate what happens during an experiment



Deer: 

T	W	TH	F
4	1	0	10

 Data Table

T	W	TH	F
20	19	14	27
0	2	0	1
11	9	10	3
2	6	4	8

Animal

Antelope Elk

Mule Deer

Whitetail Deer

Antelope  
Elk  
Mule Deer  
Whitetail Deer

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1. A graph is a kind of visual display of information or data

a. different kinds of graphs - line, bar, and circle (or pie) graphs are appropriate for displaying different types of information

## II Line Graphs

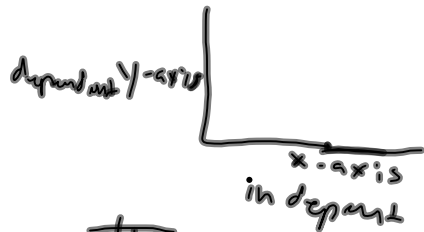
A. Line graphs are used to show trends or how the data changes over time

1. Figure 2-10, Table 2-4

B. Graphs show change

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1. In a line graph, the dependent variable is plotted on the vertical y-axis and the independent variable is plotted on the x-axis



### III. Bar Graphs

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A. Bar Graphs are useful for comparing information collected by counting

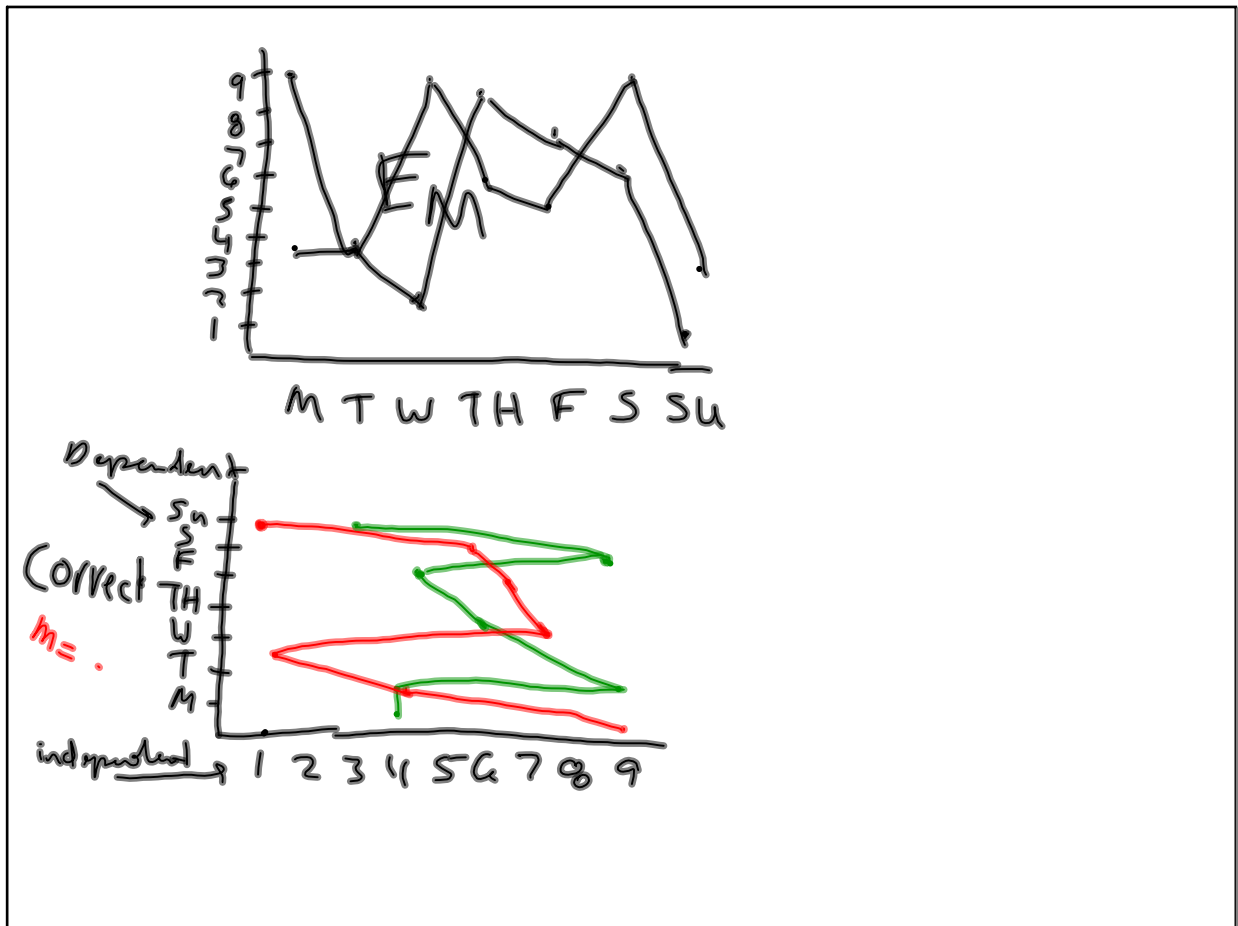
1. Table 2-5, Figure 2-11

2. Different than line graph adjacent points are not connected in a bar graph

### IV. Circle Graphs (Or Pie Graphs)

geraldine science.wikispaces.com

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Sep 25-10:01 AM

#### IV Circle Graphs (Pie Graph)

A. a Circle graph is used to show how some fixed quantity is broken down into parts

1. Circular Pie represents total (out of 100%)
2. Slices represent parts and are usually represented with a  $\frac{\%}{\text{number}}$

2.4. SI for AI?

I. SI Use in the United States

A. History of Conflict

1. 2 points of view

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- a. Drawbacks of adopting the SI system
- b. Many citizens resist the conversion to SI because the current system is so well established
  - machinery and tools would need to be changed (effects the car industry)
- c. benefits of changing to the SI system
  - SI system is based on powers of 10, therefore making it easier to use
  - makes products more readily prepared for trade with countries using SI

Sep 25-10:35 AM

Data 1

Elk	Day
7	M
4	T
3	W
5	TH
4	F
8	S
2	Su

Data 2

Antelope	Day
10	M
20	T
15	W
20	TH
10	F
15	S
10	Su

Circle Graph  
Line Graph  
Bar Graph

Data 3

Coyotes	Day
2	M
4	T
1	W
3	TH
6	F
5	S
4	Su

Data 4

Deer	Day
6	M
9	T
10	W
6	TH
4	F
6	S
8	Su

Sep 26-9:13 AM

1 lb of beef \$  $\frac{3.50}{16}$

per ounce

There are 16 oz in 1 lb

$\frac{0.31}{21\text{¢}} \rightarrow 21\text{¢}$

$K^0$   
 $K^0$

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SI Base Units		
Qty. Meas.	Unit	Symbol
length	Meter	M
Mass	Gram	G
Time	second	s
Electric current	Ampere	A
temperature	Kelvin	K <sup>0</sup>
Amount of Substance	mole	mol
Luminosity	Candela	cd

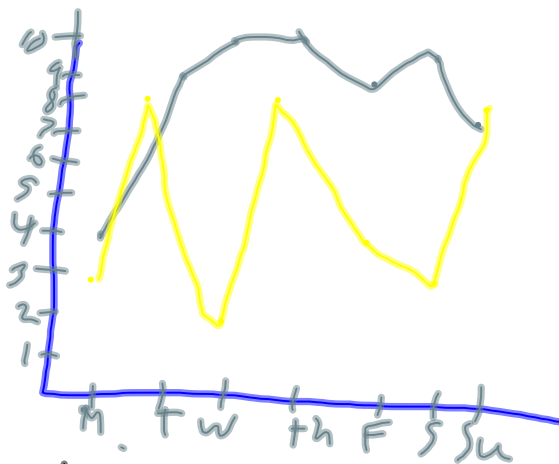
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# Common SI Prefixes

Prefix	Symbol	Multiplying Factor
Kilo-	k	1000
deci	d	0.1
centi	c	0.01
milli	m	0.001
micro-	$\mu$	0.000001
nano	n	$10^{-9}$ 0.000000001

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4. Make a graph (w/correct variables on the correct axis) of the following data table

\* morning  
\* evening

Birds  
in tree

	M	T	W	Th	F	S	Su
morning	4	9	10	10	8	9	7
evening	3	8	2	8	4	3	8

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# Chapter 2 Review

Grade: 8th  
Subject: Physical Science  
Date: 10/2/12

Oct 1-5:18 PM

1 Prefix meaning 0.001 (one over a thousandth)

Oct 1-5:20 PM

2 the amount of matter in an object

Oct 1-5:21 PM

3 Prefix meaning 1000

- A hecto
- B kilo
- C deci

Oct 1-5:21 PM

4 Mass per unit volume is ...

- A matter
- B density
- C volume

Oct 1-5:22 PM

5 basic SI unit for length

- A meter
- B yard
- C foot

Oct 1-5:22 PM

6 The system of measurement used worldwide is SI

True

False

Oct 1-5:23 PM

7 Prefix meaning 0.01 (one over a hundredth)

Oct 1-5:24 PM

8 Prefix meaning 10

Oct 1-5:24 PM

9 the SI unit for temperature

- A Celsius
- B Kelvin
- C Fahrenheit

Oct 1-5:25 PM

10 The derived unit of volume is either cubic centimeter or milliliter

True

False

Oct 1-5:25 PM

11 A measurement standard is defined as an exact quantity people use for comparison

True

False

Oct 1-5:26 PM

12 A beaker contains 0.59L of water. What is the volume in milliliters?

- A 3.2 mL
- B 32 mL
- C 320 mL

Oct 1-5:28 PM

13 The type of graph that would be used to show how some fixed quantity is broken down into parts is a ...

- A line graph
- B circle (or pie) graph
- C bar graph

Oct 1-5:31 PM



14 A unit of measurement that is obtained by combining other units is a \_\_\_\_\_ unit

- A standard
- B metric
- C derived

Oct 1-5:32 PM

15 What is the best was to express density?

- A g/cm
- B g/cm<sup>3</sup>
- C g/m

Oct 1-5:33 PM

16 Which unit cannot be used to express volume?

- A kg
- B L
- C mL

Oct 1-5:34 PM

17 Si is based on units of ten

- True
- False

Oct 1-5:34 PM

18 In a graph showing how the temperature of a material changes over time, temperature is the ...

- A dependent variable
- B independent variable
- C variable with the smallest range

Oct 1-5:37 PM

19 The amount of space occupied by an object is volume

- True
- False

Oct 1-5:38 PM

20 The basic SI unit for mass is meter

True

False

Oct 1-5:39 PM

Oct 1-5:21 PM